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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,176	08/27/2001	Steven Christopher Schmalz	01-mAE2-128	4411

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EXAMINER	
KITOV, ZEEV	
ART UNIT	**PAPER NUMBER**
2836	

DATE MAILED: 03/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/940,176	SCHMALZ, STEVEN CHRISTOPHER	
	Examiner	Art Unit	
	Zeev Kitov	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 1 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is due to a following phrase: "said bimetal including a temperature" (emphasis added). The bimetal is a structural element, which cannot include the temperature, neither as a part of its structure, nor as its function limitation. For purpose of examination, patentable weight was not given to the recited phrase.

The Claims 1 and 14 are further rejected due to following phrase: "with the series combination of said third resistor and the parallel combination of said second resistor and said thermistor being electrically connected between the first input of said amplifier and the output of said amplifier" (emphasis added). A meaning of the word "with" is not clear. For purpose of examination it was considered as a typing error.

Means and function claims

The claims 1, 4, 5, 7, 9, 14, 17 and 18 are presented in a means and function form. According to 35 U.S.C. 112, 6th paragraph, "An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall

be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof". (emphasis added).

The "means or step plus function limitation should be interpreted in a manner consistent with the specification disclosure.

Following factor support an equivalency conclusion:

A) The prior art element performs the identical function specified in the claim in substantially the same way, and produces substantially the same results as the corresponding element disclosed in specification. *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 54 USPQ2d 1308 (FED. Cir. 2000).

B) A person of ordinary skill in the art would have recognized the interchangeability of the element shown in the prior art for the corresponding element disclosed in the specification. *Caterpilar Inc. v. Deer & Co.*, 224 F.3d 1374, 56 USPQ2d 1305 (FED. Cir. 2000).

C) There are insubstantial differences between the prior art element and the corresponding element disclosed in the specification. *IMS Technology, Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1436, 54 USPQ2d 1129, 1138 (Fed. Cir. 2000).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1 – 7, 9 - 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Engel et al. (US 5,691,869) in a view of Vlasak (US 5,070,932) and further in a view of Application Notes from Alpha Sensors, Inc.

Regarding Claims 1, 14 and 20, Engel et al. disclose some elements of the Claims including a circuit breaker having: separable contacts (element11 in Fig. 1); a latchable operating mechanism including a latch member which when released opens the separable contacts (element 13 in Fig. 1); a bimetal in series with said separable contacts (element 17 in Fig. 1) and adapted for heating by current flowing therethrough, the bimetal including a temperature coefficient, a first terminal, and a second terminal having a voltage, the bimetal being adapted to deflect by said heating (col. 3, lines 35 – 49), the bimetal coupled to said latch member to release said latch member in response to a persistent overcurrent condition (col. 3, line 50 – col. 4, line 19). It further discloses means for releasing the latch member to trip the separable contacts (element 13 in Fig. 1).

However, it discloses neither a thermistor, nor an amplifier with associated circuitry.

Vlasak discloses a thermistor adapted to respond to the temperature of the bimetal (elements 37, 60 and 70 in Fig. 3, col. 4, lines 28 –43, co. 5, lines 25 - 47). Both references have the same problem solving area, namely using the bi-metal element as an electrical sensor of temperature. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Engel et

al. solution by adding the thermistor according to Vlasak, because as Vlasak states (col. 1, lines 23 – 54), the thermistor compensates the bimetal for an ambient temperature.

Application Notes from Alpha Sensors, Inc. disclose an amplifier having a first input, a second input and an output (shown in Fig. 4); a first resistor connected between the second terminal of the bimetal and the first input of the amplifier (resistor R2 in Fig. 4); a second resistor electrically connected in parallel with the thermistor (element R1 in Fig. 4). Examiner takes an Official Notice, that connection of an additional third resistor in series with a parallel combination of the thermistor and the second resistor is well known in the art and routinely performed to control the amplifier gain.

The reference further discloses the series combination of the third resistor and the parallel combination of the second resistor and the thermistor being electrically connected between the first input of the amplifier and the output of the amplifier (elements R1 and T1 in Fig. 4). As to the connection of the second input of the amplifier, according to Engel et al. reference, the second input of the arc detection circuit (element 23 in Fig. 1) is connected to the first input of the bimetal. Accordingly, when the Engel et al. reference circuit is modified according to Vlasak and further according to the Application Notes from Alpha Sensors, Inc., the second input of the amplifier will be connected to the first terminal of the bimetal. With such modification, the output signal of the amplifier would be connected to the trip mechanism (element 13 in Fig. 1 of Engel et al.), thus providing the trip signal as a function of the output voltage of the amplifier. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the Engel et al. solution by adding the

amplifier and additional circuitry according to the Application Notes from Alpha Sensors, Inc., because as the Application Notes state (in column near Fig. 4), such arrangement would linearize the thermistor characteristics.

Regarding Claims 2 and 15, Engel et al. discloses the first terminal of the bimetal having a first voltage and the voltage of the second terminal being different from the first voltage (col. 2, lines 29 –33).

Regarding Claims 3 and 16, Engel et al. discloses the bi-metal element, which inherently has a positive temperature coefficient (all metals have the positive temperature coefficient). Vlasak discloses the thermistor having a negative temperature coefficient (element 70 in Fig. 3). Both references have the same problem solving area, namely using the bi-metal element as an electrical sensor of temperature. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the Engel et al. solution by adding the thermistor with negative temperature coefficient (NTC), because as Vlasak states (col. 1, line 60 – col. 2, line 3), the NTC thermistor is necessary to provide compensation for the ambient temperature.

Regarding Claims 4, 9 and 17, Engel et al. discloses the equivalent means for providing a trip signal including means for determining an arc fault trip condition (element 23 in Fig. 1).

Regarding Claims 5 and 18, Engel et al. disclose the first terminal of the bi-metal as having a voltage; the means for providing a trip signal having a ground, which is the voltage of the first terminal of the bi-metal (connection is shown in Fig. 1 of Engel et al.);

The Application Notes disclose the amplifier as an operational amplifier having an inverting input as the first input and a non-inverting input as the second input and a fourth resistor (a bottom part of the element R3 in Fig. 4 of Application Notes) is electrically connected between the non-inverting input and said ground.

Regarding Claims 6 and 19, the Application Notes disclose the output of the operational amplifier providing a negative gain with respect to the voltage of the bi-metal. It is just inherent property of the operational amplifier, having input signal connected to its negative input.

Regarding Claim 7, Engel et al. disclose the equivalent means for releasing the latch member including a solenoid having a coil adapted for energization in response to the trip signal (element 123 in Fig. 1) and an armature (element 11 in Fig. 1) driven by the coil for releasing the latch member.

2. Regarding Claim 10, Engel et al. disclose some elements of the Claim including a method of operating a circuit breaker having separable contacts (element11 in Fig. 1) including the steps of: employing the bimetal having a temperature coefficient in series with separable contacts (element 17 in Fig. 1); heating the bimetal to by passing current through the series combination of the bimetal and the separable contacts. It further discloses outputting a voltage from the output of the arcing fault detector (element 23 in Fig. 1), providing a trip signal as a function of the voltage across the bimetal element and opening the separable contacts of the circuit breaker in response to the trip signal (col. 3,line 36-col. 4, line 19).

However, it discloses neither a thermistor, nor an amplifier with associated circuitry.

Vlasak discloses a thermistor having first and second terminals and adapted to respond to the temperature of the bimetal (elements 37, 60 and 70 in Fig. 3, col. 4, lines 28 –43, co. 5, lines 25 - 47). Both references have the same problem solving area, namely using the bi-metal element as an electrical sensor of temperature. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Engel et al. solution by adding the thermistor according to Vlasak, because as Vlasak states (col. 1, lines 23 – 54), the thermistor compensates the bimetal for an ambient temperature.

Application Notes from Alpha Sensors, Inc. disclose an amplifier having a first input, a second input and an output (shown in Fig. 4); a first resistor connected between the second terminal of the bimetal and the first input of the amplifier (resistor R2 in Fig. 4); a second resistor electrically connected in parallel with the thermistor (element R1 in Fig. 4). Examiner takes an Official Notice, that connection of an additional third resistor in series with a parallel combination of the thermistor and the second resistor is well known in the art and routinely performed to control the amplifier gain.
The reference further discloses the series combination of the third resistor and the parallel combination of the second resistor and the thermistor being electrically connected between the first input of the amplifier and the output of the amplifier (elements R1 and T1 in Fig. 4). As to the connection of the second input of the amplifier, according to Engel et al. reference, the second input of the arc detection circuit (element

23 in Fig. 1) is connected to the first input of the bimetal. Accordingly, when the Engel et al. reference circuit is modified according to Vlasak and further according to the Application Notes from Alpha Sensors, Inc., the second input of the amplifier will be connected to the first terminal of the bimetal. With such modification, the output signal of the amplifier would be connected to the trip mechanism (element 13 in Fig. 1 of Engel et al.), thus providing the trip signal as a function of the output voltage of the amplifier. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the Engel et al. solution by adding the amplifier and additional circuitry according to the Application Notes from Alpha Sensors, Inc., because as the Application Notes state (in column near Fig. 4), such arrangement would linearize the thermistor characteristics.

Regarding Claim 11, Engel et al. discloses the bi-metal element, which inherently has a positive temperature coefficient (all metals have the positive temperature coefficient). Vlasak discloses the thermistor having a negative temperature coefficient (element 70 in Fig. 3). Both references have the same problem solving area, namely using the bi-metal element as an electrical sensor of temperature. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the Engel et al. solution by adding the thermistor with negative temperature coefficient (NTC), because as Vlasak states (col. 1, line 60 – col. 2, line 3), the NTC thermistor is necessary to provide compensation for the ambient temperature.

Regarding Claim 12, Engel et al. discloses providing a trip signal as a function of an arc fault trip condition (element 23 in Fig. 1).

Regarding Claim 13, the Application Notes disclose the output of the operational amplifier providing a negative gain with respect to the voltage of the bi-metal. It is just inherent property of the operational amplifier, having input signal connected to its negative input.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Engel et al. in a view of Vlasak and Application Notes from Alpha Sensors, Inc. and further in a view of Sedgwick (US 3,593,249). A was stated above, Engel et al., Vlasak and Application Notes from Alpha Sensors, Inc. disclose all the elements of Claim 1. However, regarding Claim 8, they do not disclose cantilevered ambient compensation bimetal. Sedgwick discloses a circuit breaker, which includes a bimetal member (element 29 in Fig. 1 and 2) and a cantilevered ambient compensation bimetal (element 28 in Fig. 1 and 2) cooperating to release the latch member in response to the persistent overcurrent condition, while being compensated for ambient conditions (col. 1,line 56 – col. 2, line 16). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the Engel et al. solution by adding the cantilevered ambient compensation bimetal according to Sedgwick, because as Sedgwick states (col. 1, lines 20 – 22), it would provide an ambient temperature compensation for tripping in the persistent overcurrent condition. Use of the NTC thermistor according to Vlasask helps to compensate the circuit breaker with respect to the voltage drop across the bi-metal, i.e. with respect to the arc condition detection, but it does not help with regard to the persistent overcurrents.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose telephone number is (571) 272 2052. The examiner can normally be reached on 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272 2800, Ext. 36. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

03/05/04
Z.K.

GREGORY J. TOATLEY, JR.
PRIMARY EXAMINER